

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: _____ Art Unit: _____
JONATHAN ZONANA, BETSY M. FERGUSON,
DENIS HEADON, and PAUL OVERBEEK
Application No. _____

Filed: Herewith

For: HYPOHIDROTIC ECTODERMAL
DYSPLASIA GENES AND PROTEINS

Examiner: _____

Date: December 4, 2000

STATEMENT IN COMPLIANCE WITH 37 C.F.R. § 1.821(f)

TO THE COMMISSIONER FOR PATENTS
Washington, DC 20231

Sir:

In compliance with 37 C.F.R. § 1.821(f), the undersigned declares that the nucleotide and/or amino acid sequences presented in the paper copy of the "Sequence Listing" submitted herewith are the same as the sequences contained in the computer-readable form of said "Sequence Listing." No new matter has been added.

Respectfully submitted,

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SEQUENCE LISTING

<110> Zonana et al.

<120> Hypohydrotic ectodermal dysplasia genes and proteins

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<222> (260)..(1606)

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Cys	Cys	Ser	Ser	Pro		Gly	Lys	Ser	Ala	Glu	Ala	Pro	Ala	Asn	Thr		
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Lys Asp Asp Asp Tyr Gly Cys Val Pro Cys Pro Ala Glu Lys Phe Ser
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Lys Gly Gly Tyr Gln Ile Cys Arg Arg His Lys Asp Cys Glu Gly Phe
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Cys Gly Pro Cys Leu Pro Gly Tyr Tyr Met Leu Glu Asn Arg Pro Arg
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cgg gcg ggc gaa ggg aac agc tgc ctg ctc ttc ctg ggt ttc ttt ggc 144
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cct Pro 225	caa Gln	gga Gly	ccc Pro	cct Pro	ggc Gly 230	ctc Leu	cag Gln	gga Gly	cct Pro 235	tct Ser 235	ggt Gly	gct Ala	gct Ala	gat Asp	aaa Lys 240	720
gct Ala	gga Gly	act Thr	cga Arg	gaa Glu 245	aac Asn	cag Gln	cca Pro	gct Ala	gtg Val 250	gtg Val	cat His	cta Leu	cag Gln	ggc Gly 255	caa Gln	768
ggg Gly	tca Ser	gca Ala 260	att Ile 260	caa Gln	gtc Val	aag Lys	aat Asn 265	gat Asp 265	ctt Leu	tca Ser	ggt Gly	gga Gly 270	gtg Val 270	ctc Leu	aat Asn	816
gac Asp	tgg Trp 275	tct Ser	cgc Arg	atc Ile	act Thr	atg Met 280	aac Asn 280	ccc Pro 285	aag Lys 285	gtg Val 290	ttt Phe 290	aag Lys 295	cta Leu	cat His	ccc Pro	864
cgc Arg	agc Ser 290	ggg Gly	gag Glu	ctg Leu	gag Glu	gta Val 295	ctg Leu	gtg Val	gac Asp	ggc Gly 300	acc Thr 300	tac Tyr	ttc Phe	atc Ile	tat Tyr	912
agt Ser 305	cag Gln	gta Val	gaa Glu	gta Val 310	tac Tyr	tac Tyr	atc Ile	aac Asn	ttc Phe 315	act Thr 315	gac Asp	ttt Phe	gcc Ala	agc Ser	tat Tyr 320	960
gag Glu	gtg Val	gtg Val	gtg Val 325	gat Asp	gag Glu	aag Lys	ccc Pro	ttc Phe 330	ctg Leu	cag Gln	tgc Cys	aca Thr	cgc Arg	agc Ser 335	atc Ile	1008
gag Glu	acg Thr	ggc Gly	aag Lys 340	acc Thr	aac Asn	tac Tyr	aac Asn	act Thr 345	tgc Cys	tat Tyr	acc Thr	gca Ala	ggc Gly 350	gtc Val	tgc Cys	1056
ctc Leu	ctc Leu 355	aag Lys 355	gcc Ala	cgg Arg	cag Gln	aag Lys 360	atc Ile 360	gcc Ala	gtc Val 365	aag Lys 365	atg Met 365	gtg Val 365	cac His	gct Ala	gac Asp	1104

165										170					175					
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Lys	Lys	Ala	Gly	Pro	Pro	Gly	Pro	Asn	Gly	Pro	Pro	Gly	Pro	Pro	Gly					
			180					185					190							
cct	ccg	gga	ccc	cag	gga	cct	cca	ggg	att	cca	gga	att	cct	ggg	att	624				
Pro	Pro	Gly	Pro	Gln	Gly	Pro	Pro	Gly	Ile	Pro	Gly	Ile	Pro	Gly	Ile					
			195				200					205								
cca	gga	aca	act	gtt	atg	gga	cca	cct	ggc	cca	cct	ggc	cct	cct	ggt	672				
Pro	Gly	Thr	Thr	Val	Met	Gly	Pro	Pro	Gly	Pro	Pro	Gly	Pro	Pro	Gly					
			210			215						220								
cct	caa	gga	ccc	cct	ggc	ctc	caa	gga	cct	tct	ggt	gct	gct	gat	aaa	720				
Pro	Gln	Gly	Pro	Pro	Gly	Leu	Gln	Gly	Pro	Ser	Gly	Ala	Ala	Asp	Lys					
225					230				235						240					
act	gga	act	cgg	gaa	aat	cag	cca	gct	gtg	gtg	cat	ctg	cag	ggc	caa	768				
Thr	Gly	Thr	Arg	Glu	Asn	Gln	Pro	Ala	Val	Val	His	Leu	Gln	Gly	Gln					
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ggg	tca	gca	att	caa	gtc	aaa	aat	gat	ctt	tca	ggt	gga	gtg	ctc	aat	816				
Gly	Ser	Ala	Ile	Gln	Val	Lys	Asn	Asp	Leu	Ser	Gly	Gly	Val	Leu	Asn					
			260					265					270							
gac	tgg	tct	cgc	atc	act	atg	aac	cct	aag	gtg	ttt	aaa	cta	cat	ccc	864				
Asp	Trp	Ser	Arg	Ile	Thr	Met	Asn	Pro	Lys	Val	Phe	Lys	Leu	His	Pro					
			275				280					285								
cgc	agc	ggg	gag	ctg	gag	gtc	tac	tac	atc	aac	ttc	act	gac	ttt	gcc	912				
Arg	Ser	Gly	Glu	Leu	Glu	Val	Tyr	Tyr	Ile	Asn	Phe	Thr	Asp	Phe	Ala					
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agc	tac	gag	gtg	gtg	gtg	gat	gag	aag	ccc	ttc	ctg	cag	tgc	acc	cgc	960				
Ser	Tyr	Glu	Val	Val	Val	Asp	Glu	Lys	Pro	Phe	Leu	Gln	Cys	Thr	Arg					
305					310				315						320					
agc	att	gag	aca	ggg	aag	acc	aac	tac	aac	act	tgc	tat	act	gca	ggc	1008				
Ser	Ile	Glu	Thr	Gly	Lys	Thr	Asn	Tyr	Asn	Thr	Cys	Tyr	Thr	Ala	Gly					
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gtg	tgc	ctc	ctc	aag	gcc	agg	cag	aaa	atc	gcc	gtg	aag	atg	gtg	cac	1056				
Val	Cys	Leu	Leu	Lys	Ala	Arg	Gln	Lys	Ile	Ala	Val	Lys	Met	Val	His					
			340					345					350							
gct	gac	atc	tct	atc	aat	atg	agc	aag	cac	acc	acc	ttc	ttc	ggg	gcc	1104				
Ala	Asp	Ile	Ser	Ile	Asn	Met	Ser	Lys	His	Thr	Thr	Phe	Phe	Gly	Ala					
			355			360						365								
atc	agg	ctg	ggc	gaa	gcc	cct	gca	tcc	tag							1134				
Ile	Arg	Leu	Gly	Glu	Ala	Pro	Ala	Ser												
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gtg gtg tct ctg atg tgc tca gcc cga gcg gaa tac tca aac tgc ggt	96
Val Val Ser Leu Met Cys Ser Ala Arg Ala Glu Tyr Ser Asn Cys Gly	
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gag aac gag tac tac aac cag act acg ggg ctg tgc cag gag tgc ccc	144
Glu Asn Glu Tyr Tyr Asn Gln Thr Thr Gly Leu Cys Gln Glu Cys Pro	
35 40 45	
ccg tgt ggg ccg gga gag gag ccc tac ctg tcc tgt ggc tac ggc acc	192
Pro Cys Gly Pro Gly Glu Glu Pro Tyr Leu Ser Cys Gly Tyr Gly Thr	
50 55 60	
aaa gac gag gac tac ggc tgc gtc ccc tgc ccg gcg gag aag ttt tcc	240
Lys Asp Glu Asp Tyr Gly Cys Val Pro Cys Pro Ala Glu Lys Phe Ser	
65 70 75 80	
aaa gga ggc tac cag ata tgc agg cgt cac aaa gac tgt gag ggc ttc	288
Lys Gly Gly Tyr Gln Ile Cys Arg Arg His Lys Asp Cys Glu Gly Phe	
85 90 95	
ttc cgg gcc acc gtg ctg aca cca ggg gac atg gag aat gac gct gag	336
Phe Arg Ala Thr Val Leu Thr Pro Gly Asp Met Glu Asn Asp Ala Glu	
100 105 110	
tgt ggc cct tgc ctc cct ggc tac tac atg ctg gag aac aga ccg agg	384
Cys Gly Pro Cys Leu Pro Gly Tyr Tyr Met Leu Glu Asn Arg Pro Arg	
115 120 125	
aac atc tat ggc atg gtc tgc tac tcc tgc ctc ctg gca ccc ccc aac	432
Asn Ile Tyr Gly Met Val Cys Tyr Ser Cys Leu Leu Ala Pro Pro Asn	
130 135 140	
acc aag gaa tgt gtg gga gcc act tca gga gct tct gcc aac ttc cct	480
Thr Lys Glu Cys Val Gly Ala Thr Ser Gly Ala Ser Ala Asn Phe Pro	
145 150 155 160	
ggc acc tcg ggc agc agc acc ctg tct ccc ttc cag cac gcc cac aaa	528
Gly Thr Ser Gly Ser Ser Thr Leu Ser Pro Phe Gln His Ala His Lys	
165 170 175	
gaa ctc tca ggc caa gga cac ctg gcc act gcc ctg atc att gca atg	576
Glu Leu Ser Gly Gln Gly His Leu Ala Thr Ala Leu Ile Ile Ala Met	
180 185 190	
tcc acc atc ttc atc atg gcc atc gcc atc gtc ctc atc atc atg ttc	624
Ser Thr Ile Phe Ile Met Ala Ile Ala Ile Val Leu Ile Ile Met Phe	
195 200 205	
tac atc ctg aag aca aag ccc tct gcc cca gcc tgt tgc acc agc cac	672
Tyr Ile Leu Lys Thr Lys Pro Ser Ala Pro Ala Cys Cys Thr Ser His	
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ccg ggg aag agc gtg gag gcc caa gtg agc aag gac gag gag aag aaa	720

Pro Gly Lys Ser Val Glu Ala Gln Val Ser Lys Asp Glu Glu Lys Lys	
225 230 235 240	
gag gcc cca gac aac gtg gtg atg ttc tcc gag aag gat gaa ttt gag	768
Glu Ala Pro Asp Asn Val Val Met Phe Ser Glu Lys Asp Glu Phe Glu	
245 250 255	
aag ctg aca gca act cca gca aag ccc acc aag agc gag aac gat gcc	816
Lys Leu Thr Ala Thr Pro Ala Lys Pro Thr Lys Ser Glu Asn Asp Ala	
260 265 270	
tca tcc gag aat gag cag ctg ctg agc cgg agc gtc gac agt gat gag	864
Ser Ser Glu Asn Glu Gln Leu Leu Ser Arg Ser Val Asp Ser Asp Glu	
275 280 285	
gag ccc gcc cct gac aag cag ggc tcc ccg gag ctg tgc ctg ctg tcg	912
Glu Pro Ala Pro Asp Lys Gln Gly Ser Pro Glu Leu Cys Leu Leu Ser	
290 295 300	
ctg gtt cac ctg gcc agg gag aag tct gcc acc agc aac aag tca gcc	960
Leu Val His Leu Ala Arg Glu Lys Ser Ala Thr Ser Asn Lys Ser Ala	
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ggg att caa agc cgg agg aaa aag atc ctc gat gtg tat gcc aac gtg	1008
Gly Ile Gln Ser Arg Arg Lys Lys Ile Leu Asp Val Tyr Ala Asn Val	
325 330 335	
tgt gga gtc gtg gaa ggt ctt agc ccc acg gag ctg cca ttt gat tgc	1056
Cys Gly Val Val Glu Gly Leu Ser Pro Thr Glu Leu Pro Phe Asp Cys	
340 345 350	
ctc gag aag act agc cga atg ctc agc tcc acg tac aac tct gag aag	1104
Leu Glu Lys Thr Ser Arg Met Leu Ser Ser Thr Tyr Asn Ser Glu Lys	
355 360 365	
gct gtt gtg aaa acg tgg cgc cac ctc gcc gag agc ttc ggc ctg aag	1152
Ala Val Val Lys Thr Trp Arg His Leu Ala Glu Ser Phe Gly Leu Lys	
370 375 380	
agg gat gag att ggg ggc atg aca gac ggc atg caa ctc ttt gac cgc	1200
Arg Asp Glu Ile Gly Gly Met Thr Asp Gly Met Gln Leu Phe Asp Arg	
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atc agc acg gca ggc tac agc atc cct gag cta ctc aca aaa ctg gtg	1248
Ile Ser Thr Ala Gly Tyr Ser Ile Pro Glu Leu Leu Thr Lys Leu Val	
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cag att gag cgg ctg gat gct gtg gag tcc ttg tgt gca gac ata ctg	1296
Gln Ile Glu Arg Leu Asp Ala Val Glu Ser Leu Cys Ala Asp Ile Leu	
420 425 430	
gag tgg gcg ggg gtt gtg cca cct gcc tcc cag cca cat gct gca tcc	1344
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<212> PRT
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Glu	Asn	Glu	Tyr	Tyr	Asn	Gln	Thr	Thr	Gly	Leu	Cys	Gln	Glu	Cys	Pro
			35				40					45			
Pro	Cys	Gly	Pro	Gly	Glu	Glu	Pro	Tyr	Leu	Ser	Cys	Gly	Tyr	Gly	Thr
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Lys	Asp	Glu	Asp	Tyr	Gly	Cys	Val	Pro	Cys	Pro	Ala	Glu	Lys	Phe	Ser
					70					75					80
Lys	Gly	Gly	Tyr	Gln	Ile	Cys	Arg	Arg	His	Lys	Asp	Cys	Glu	Gly	Phe
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Phe	Arg	Ala	Thr	Val	Leu	Thr	Pro	Gly	Asp	Met	Glu	Asn	Asp	Ala	Glu
			100					105					110		
Cys	Gly	Pro	Cys	Leu	Pro	Gly	Tyr	Met	Leu	Glu	Asn	Arg	Pro	Arg	
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Asn	Ile	Tyr	Gly	Met	Val	Cys	Tyr	Ser	Cys	Leu	Leu	Ala	Pro	Pro	Asn
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Thr	Lys	Glu	Cys	Val	Gly	Ala	Thr	Ser	Gly	Ala	Ser	Ala	Asn	Phe	Pro
					150					155					160
Gly	Thr	Ser	Gly	Ser	Ser	Thr	Leu	Ser	Pro	Phe	Gln	His	Ala	His	Lys
				165					170					175	
Glu	Leu	Ser	Gly	Gln	Gly	His	Leu	Ala	Thr	Ala	Leu	Ile	Ile	Ala	Met
			180					185					190		
Ser	Thr	Ile	Phe	Ile	Met	Ala	Ile	Ala	Ile	Val	Leu	Ile	Ile	Met	Phe
			195				200						205		
Tyr	Ile	Leu	Lys	Thr	Lys	Pro	Ser	Ala	Pro	Ala	Cys	Cys	Thr	Ser	His
			210			215					220				
Pro	Gly	Lys	Ser	Val	Glu	Ala	Gln	Val	Ser	Lys	Asp	Glu	Glu	Lys	Lys
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Glu	Ala	Pro	Asp	Asn	Val	Val	Met	Phe	Ser	Glu	Lys	Asp	Glu	Phe	Glu
				245					250					255	
Lys	Leu	Thr	Ala	Thr	Pro	Ala	Lys	Pro	Thr	Lys	Ser	Glu	Asn	Asp	Ala
			260					265						270	
Ser	Ser	Glu	Asn	Glu	Gln	Leu	Leu	Ser	Arg	Ser	Val	Asp	Ser	Asp	Glu
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Glu	Pro	Ala	Pro	Asp	Lys	Gln	Gly	Ser	Pro	Glu	Leu	Cys	Leu	Leu	Ser
			290			295					300				
Leu	Val	His	Leu	Ala	Arg	Glu	Lys	Ser	Ala	Thr	Ser	Asn	Lys	Ser	Ala
					310					315					320
Gly	Ile	Gln	Ser	Arg	Arg	Lys	Lys	Ile	Leu	Asp	Val	Tyr	Ala	Asn	Val
				325					330					335	
Cys	Gly	Val	Val	Glu	Gly	Leu	Ser	Pro	Thr	Glu	Leu	Pro	Phe	Asp	Cys
			340					345					350		
Leu	Glu	Lys	Thr	Ser	Arg	Met	Leu	Ser	Ser	Thr	Tyr	Asn	Ser	Glu	Lys
			355				360					365			
Ala	Val	Val	Lys	Thr	Trp	Arg	His	Leu	Ala	Glu	Ser	Phe	Gly	Leu	Lys
			370				375					380			
Arg	Asp	Glu	Ile	Gly	Gly	Met	Thr	Asp	Gly	Met	Gln	Leu	Phe	Asp	Arg
				390						395					400
Ile	Ser	Thr	Ala	Gly	Tyr	Ser	Ile	Pro	Glu	Leu	Leu	Thr	Lys	Leu	Val
				405					410					415	
Gln	Ile	Glu	Arg	Leu	Asp	Ala	Val	Glu	Ser	Leu	Cys	Ala	Asp	Ile	Leu
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 gagggaaagc ccctcggcaa ggactgagtt tccaaacttg cagacagggc agggagcggg 180
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 ccttgggaga gg atg gcc cat gtg ggg gac tgc acg cag acg ccc tgg ctc 471
 Met Ala His Val Gly Asp Cys Thr Gln Thr Pro Trp Leu
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 Pro Val Leu Val Val Ser Leu Met Cys Ser Ala Arg Ala Glu Tyr Ser
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 aac tgc ggt gag aac gag tac tac aac cag act acg ggg ctg tgc cag 567
 Asn Cys Gly Glu Asn Glu Tyr Tyr Asn Gln Thr Thr Gly Leu Cys Gln
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 Glu Cys Pro Pro Cys Gly Pro Gly Glu Glu Pro Tyr Leu Ser Cys Gly
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 tac ggc acc aaa gac gag gac tac ggc tgc gtc ccc tgc ccg gcg gag 663
 Tyr Gly Thr Lys Asp Glu Asp Tyr Gly Cys Val Pro Cys Pro Ala Glu
 65 70 75
 aag ttt tcc aaa gga ggc tac cag ata tgc agg cgt cac aaa gac tgt 711
 Lys Phe Ser Lys Gly Gly Tyr Gln Ile Cys Arg Arg His Lys Asp Cys
 80 85 90
 gag ggc ttc ttc cgg gcc acc gtg ctg aca cca ggg gac atg gag aat 759
 Glu Gly Phe Phe Arg Ala Thr Val Leu Thr Pro Gly Asp Met Glu Asn
 95 100 105
 gac gct gag tgt ggc cct tgc ctc cct ggc tac tac atg ctg gag aac 807
 Asp Ala Glu Cys Gly Pro Cys Leu Pro Gly Tyr Tyr Met Leu Glu Asn
 110 115 120 125
 aga ccg agg aac atc tat ggc atg gtc tgc tac tcc tgc ctc ctg gca 855
 Arg Pro Arg Asn Ile Tyr Gly Met Val Cys Tyr Ser Cys Leu Leu Ala
 130 135 140

ccc ccc aac acc aag gaa tgt gtg gga gcc act tca gga gct tct gcc	903
Pro Pro Asn Thr Lys Glu Cys Val Gly Ala Thr Ser Gly Ala Ser Ala	
145 150 155	
aac ttc cct ggc acc tcg ggc agc agc acc ctg tct ccc ttc cag cac	951
Asn Phe Pro Gly Thr Ser Gly Ser Ser Thr Leu Ser Pro Phe Gln His	
160 165 170	
gcc cac aaa gaa ctc tca ggc caa gga cac ctg gcc act gcc ctg atc	999
Ala His Lys Glu Leu Ser Gly Gln Gly His Leu Ala Thr Ala Leu Ile	
175 180 185	
att gca atg tcc acc atc ttc atc atg gcc atc gcc atc gtc ctc atc	1047
Ile Ala Met Ser Thr Ile Phe Ile Met Ala Ile Ala Ile Val Leu Ile	
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Ile Met Phe Tyr Ile Leu Lys Thr Lys Pro Ser Ala Pro Ala Cys Cys	
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Thr Ser His Pro Gly Lys Ser Val Glu Ala Gln Val Ser Lys Asp Glu	
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Glu Lys Lys Glu Ala Pro Asp Asn Val Val Met Phe Ser Glu Lys Asp	
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Glu Phe Glu Lys Leu Thr Ala Thr Pro Ala Lys Pro Thr Lys Ser Glu	
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Asn Asp Ala Ser Ser Glu Asn Glu Gln Leu Leu Ser Arg Ser Val Asp	
270 275 280 285	
agt gat gag gag ccc gcc cct gac aag cag ggc tcc ccg gag ctg tgc	1335
Ser Asp Glu Glu Pro Ala Pro Asp Lys Gln Gly Ser Pro Glu Leu Cys	
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ctg ctg tcg ctg gtt cac ctg gcc agg gag aag tct gcc acc agc aac	1383
Leu Leu Ser Leu Val His Leu Ala Arg Glu Lys Ser Ala Thr Ser Asn	
305 310 315	
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Lys Ser Ala Gly Ile Gln Ser Arg Arg Lys Lys Ile Leu Asp Val Tyr	
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gcc aac gtg tgt gga gtc gtg gaa ggt ctt agc ccc acg gag ctg cca	1479
Ala Asn Val Cys Gly Val Val Glu Gly Leu Ser Pro Thr Glu Leu Pro	
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Phe Asp Cys Leu Glu Lys Thr Ser Arg Met Leu Ser Ser Thr Tyr Asn	
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Ser Glu Lys Ala Val Val Lys Thr Trp Arg His Leu Ala Glu Ser Phe	
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 Phe Asp Arg Ile Ser Thr Ala Gly Tyr Ser Ile Pro Glu Leu Leu Thr
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 415 420 425

gac ata ctg gag tgg gcg ggg gtt gtg cca cct gcc tcc cag cca cat 1767
 Asp Ile Leu Glu Trp Ala Gly Val Val Pro Pro Ala Ser Gln Pro His
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 Ala Ala Ser

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tgtgatattgt caccgtatgc cttaggatgt tcaaggagcc agacgaaata aggcctgtct 1939

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<210> 19
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 <213> Mus musculus

<400> 19
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 35 40 45
 Pro Cys Arg Pro Gly Glu Glu Pro Tyr Met Ser Cys Gly Tyr Gly Thr
 50 55 60
 Lys Asp Asp Asp Tyr Gly Cys Val Pro Cys Pro Ala Glu Lys Phe Ser
 65 70 75 80

Lys Gly Gly Tyr Gln Ile Cys Arg Arg His Lys Asp Cys Glu Gly Phe
 85 90 95
 Phe Arg Ala Thr Val Leu Thr Pro Gly Asp Met Glu Asn Asp Ala Glu
 100 105 110
 Cys Gly Pro Cys Leu Pro Gly Tyr Tyr Met Leu Glu Asn Arg Pro Arg
 115 120 125
 Asn Ile Tyr Gly Met Val Cys Tyr Ser Cys Leu Leu Ala Pro Pro Asn
 130 135 140
 Thr Lys Glu Cys Val Gly Ala Thr Ser Gly Val Ser Ala His Ser Ser
 145 150 155 160
 Ser Thr Ser Gly Gly Ser Thr Leu Ser Pro Phe Gln His Ala His Lys
 165 170 175
 Glu Leu Ser Gly Gln Gly His Leu Ala Thr Ala Leu Ile Ile Ala Met
 180 185 190
 Ser Thr Ile Phe Ile Met Ala Ile Ala Ile Val Leu Ile Ile Met Phe
 195 200 205
 Tyr Ile Met Lys Thr Lys Pro Ser Ala Pro Ala Cys Cys Ser Ser Pro
 210 215 220
 Pro Gly Lys Ser Ala Glu Ala Pro Ala Asn Thr His Glu Glu Lys Lys
 225 230 235 240
 Glu Ala Pro Asp Ser Val Val Thr Phe Pro Glu Asn Gly Glu Phe Gln
 245 250 255
 Lys Leu Thr Ala Thr Pro Thr Lys Thr Pro Lys Ser Glu Asn Asp Ala
 260 265 270
 Ser Ser Glu Asn Glu Gln Leu Leu Ser Arg Ser Val Asp Ser Asp Glu
 275 280 285
 Glu Pro Ala Pro Asp Lys Gln Gly Ser Pro Glu Leu Cys Leu Leu Ser
 290 295 300
 Leu Val His Leu Ala Arg Glu Lys Ser Val Thr Ser Asn Lys Ser Ala
 305 310 315 320
 Gly Ile Gln Ser Arg Arg Lys Lys Ile Leu Asp Val Tyr Ala Asn Val
 325 330 335
 Cys Gly Val Val Glu Gly Leu Ser Pro Thr Glu Leu Pro Phe Asp Cys
 340 345 350
 Leu Glu Lys Thr Ser Arg Met Leu Ser Ser Thr Tyr Asn Ser Glu Lys
 355 360 365
 Ala Val Val Lys Thr Trp Arg His Leu Ala Glu Ser Phe Gly Leu Lys
 370 375 380
 Arg Asp Glu Ile Gly Gly Met Thr Asp Gly Met Gln Leu Phe Asp Arg
 385 390 395 400

Ile Ser Thr Ala Gly Tyr Ser Ile Pro Glu Leu Leu Thr Lys Leu Val
405 410 415

Gln Ile Glu Arg Leu Asp Ala Val Glu Ser Leu Cys Ala Asp Ile Leu
420 425 430

Glu Trp Ala Gly Val Val Pro Pro Ala Ser Pro Pro Pro Ala Ala Ser
435 440 445

<210> 20
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to amplify exon 5 of
EDA1-II.

<400> 20
agaaagcagg acctcctgg 19

<210> 21
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to amplify exon 5 of
EDA1-II.

<400> 21
ctctcaggat caccactc 19

<210> 22
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 22
tatgttggt atgactgact gactgg 26

<210> 23
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 23
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<210> 24
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 24
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<210> 25
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 25
tgtcaattca ccacaggag 20

<210> 26
<211> 19
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 26
gaatctagga tgcaggggc 19

<210> 27
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnose ED.

<400> 27
tattgcggcg aacacg 16

<210> 28
<211> 16
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnos ED.

<400> 28
tattgcagcg aacacg

16

<210> 29
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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used to
diagnos ED.

<400> 29
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17

<210> 30
<211> 20
<212> DNA
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<220>

<223> Description of Artificial Sequence:
Oligonucleotide primers used to screen a BAC
library.

<400> 30
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<210> 31
<211> 20
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<220>

<223> Description of Artificial Sequence:
Oligonucleotide primers used to screen a BAC
library.

<400> 31
acctactgca tgtctgtgga

20

<210> 32
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to screen a BAC
 library.

<400> 32
 cacatgctca gtgttgcca 20

<210> 33
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to screen a BAC
 library.

<400> 33
 acacaggctc agtcatgcgg 20

<210> 34
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
 gene.

<400> 34
 gcggtgaccc gggagatctg aattc 25

<210> 35
 <211> 11
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
 gene.

<400> 35
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<210> 36
 <211> 21
 <212> DNA
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<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
 gene.

<400> 36
ctgagcggaa ttcgtgagac c

21

<210> 37
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to clone a murine dl
gene.

<400> 37
ggtctcacga attccgctca gtt

23

<210> 38
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to clone a murine dl
gene.

<400> 38
agtgagaatg atgcctcc

18

<210> 39
<211> 19
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to clone a murine dl
gene.

<400> 39
gcctttgttc agtcatagg

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<210> 40
<211> 19
<212> DNA
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers used to clone a murine dl
gene.

<400> 40
cctgagagct ctttgtgag

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<210> 41

<211> 29
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 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
 gene.

 <400> 41
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<210> 42
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 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
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 <400> 42
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<210> 43
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 Oligonucleotide primers used to clone a murine dl
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 <400> 43
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<210> 44
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 <223> Description of Artificial Sequence:
 Oligonucleotide primers used to clone a murine dl
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 <400> 44
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<210> 45
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 <212> DNA
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 <220>

<223> Description of Artificial Sequence:
Oligonucleotide primers used to clone a murine dl
gene.

<400> 45
gcggatccag gccgctctgg acaggatatg

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<210> 46
<211> 17
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 46
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<210> 47
<211> 18
<212> DNA
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 47
acagtggccc ggaagaag

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<210> 48
<211> 19
<212> DNA
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 48
ctgcggtgag aacgagtac

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<210> 49
<211> 18
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 49

ggcaaggtgg cgccatgt

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<210> 50

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide primers that were used to clone
human DL.

<400> 50

ggcaccaaag acgaggacta

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<210> 51

<211> 20

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:

Oligonucleotide primers that were used to clone
human DL.

<400> 51

tcagcgatcat tctccatgtc

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<210> 52

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide primers that were used to clone
human DL.

<400> 52

ctagactcga gaattcgcg cgcactagt tttttttttt tttttt

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<210> 53

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide primers that were used to clone
human DL.

<400> 53

tcctgtagcc tcctttggaa

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<210> 54

<211> 17

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 54
ctagactcga gaattcg

17

<210> 55
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 55
tagtcctcgt ctttggtgcc

20

<210> 56
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 56
gagaattcgc ggccgcac

18

<210> 57
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 57
agccccgtag tctggttgta

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<210> 58
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:

Oligonucleotide primers that were used to clone
human DL.

<400> 58
gcgtcgacag tgatgagga

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<210> 59
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 59
cagtcttttg gcaccactca

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<210> 60
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 60
acgtgtgtgg agtcgtgga

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<210> 61
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 61
ctcgttgga ccttggtt

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<210> 62
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 62
tacatgctgg agaacagacc

20

<210> 63
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 63
ttccaaagga ggctaccaga 20

<210> 64
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 64
ttggcagaag ctctgaagt 20

<210> 65
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 65
tgctcgagat gtgatgaagg 20

<210> 66
<211> 20
<212> DNA
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 66
aagcagatgg ccacagaact 20

<210> 67
<211> 19
<212> DNA

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<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 67

ggagaggatg gcccatgtg

19

<210> 68

<211> 21

<212> DNA

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<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 68

cagaccatgc catagatgtt c

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<210> 69

<211> 20

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 69

acttcaggag cttctgccaa

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<210> 70

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 70

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<210> 71

<211> 21

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone

human DL.

<400> 71
ggatgaattt gagaagctga c 21

<210> 72
<211> 19
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 72
ctgacttggt cgtggtggc 19

<210> 73
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that were used to clone
human DL.

<400> 73
tccacgactc cacacacgt 19

<210> 74
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 74
aaataaaggt agccagaccc 20

<210> 75
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 75
gtaaggggct cagaccact 19

<210> 76
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 76
catgtgtttc taaggaggta c 21

<210> 77
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 77
caacaatgcc acaagcagga 20

<210> 78
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 78
gtccgtatgg tttggctgc 19

<210> 79
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 79
gccagggttt gccaggag 18

<210> 80
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers that can be used for
 mutation screening of human DL.

<400> 80
 gtccagctca cctgtctct 19

<210> 81
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers that can be used for
 mutation screening of human DL.

<400> 81
 accggctctt tcctacacc 19

<210> 82
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers that can be used for
 mutation screening of human DL.

<400> 82
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<210> 83
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers that can be used for
 mutation screening of human DL.

<400> 83
 aactccaggt gatcgatacc 20

<210> 84
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:
 Oligonucleotide primers that can be used for
 mutation screening of human DL.

<400> 84
ctgggtcatt catgccttct 20

<210> 85
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 85
atggtgtgtg gaagccctg 19

<210> 86
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 86
catgagccaa ttctaactcc t 21

<210> 87
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 87
caggacccca gttagctt 19

<210> 88
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 88
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<210> 89
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 89
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<210> 90
<211> 21
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<213> Artificial Sequence

<220>
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Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 90
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<210> 91
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<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 91
cccagccctt catgtcagt 19

<210> 92
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 92
tctattgact gtgacttgca 20

<210> 93
<211> 19
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Oligonucleotide primers that can be used for
mutation screening of human DL.

<400> 93

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19

<210> 94

<211> 425

<212> DNA

<213> Homo sapiens

<400> 94

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<210> 95

<211> 434

<212> DNA

<213> Homo sapiens

<400> 95

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<210> 96

<211> 70

<212> DNA

<213> Homo sapiens

<400> 96

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<210> 97

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<212> DNA

<213> Homo sapiens

<220>

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<223> n represents a, c, t or g.

<400> 97
gtaagtgggc tgagccccctt acccccacag caccctcatc ctcatgatgg ttggactggt 60
tcttgccctc ttcagctgta aaatgggaat gctgatcata gtccctcctc cacagggttc 120
ttctgagggg gaaatgaaac caggcctgca aagcacagaa ctctgccccca ggctgaagtt 180
acattgattt cgttggtagc tcccttcata gggctctcatg gatataaacg ttcttgattg 240
cttgtttgtg gtgtgataca cacagccctg tgtctatgtg atgagctcat gcttgggggc 300
cgcgcagcta agaaagactt ggaagactca gaccctacc cccatcctcc tggacacgcc 360
gggtgttctga ggagccactg tattagaggc tcagtggggg acagggggcg ctccctccatg 420
accttgggcaa gtgcgttgat gaggagaact canagcaggc cttgatgggt ggatgggggt 480
tggccagcag ggggtgaaggc aggggtgggtc tagtgggggc tggccgtgcc cangtggatc 540
aaccaggagc cactggagac ttaacagcag tgagcactna caagcggcac cttcccagac 600
cgagccccc gacagagccc caccgcaggg cacccttc ctatgtcaac cttggggtct 660
tgcaggagtc acatgtgttt ctaaggagggt acggaggcca caacacccc cttgtgtggc 720
ag 722

<210> 98
<211> 123
<212> DNA
<213> Homo sapiens

<400> 98
gtgtctctga tgtgctcagc ccgagcggaa tactcaaact gcggtgagaa cgagtactac 60
aaccagacta cggggctgtg ccaggagtgc ccccgctgtg ggccgggaga ggagccctac 120
ctg 123

<210> 99
<211> 740
<212> DNA
<213> Homo sapiens

<400> 99
gtaaggaccc agccctcctg gagcctgggt cgctctcagg ggaggcctcc tgcttgtggc 60
attgttgccc tgagcctgcc ttgctgtgtg aggggatgcc agggatatc aaaccagccg 120
gtcacgctcc ctggacgttg agattgatgg caagagctgc cgtgagccca ggaatggcac 180
tcaccagcta agcattcata aacagatttt tcaggagtgc tgaaatgttt ttaaaggatc 240
actttccac tctaccctga ttaaagagc gtcagatcat ctgattggaa gcaggattga 300
aatattctcc agtactagta ctttttttcc tgagtgtctgc atctccctcc gcctctgggc 360
aagctaagcc tgagtgttct gttcagcact aagggaaacc tccgggggtt cagtgtccgg 420
ttcttgtagc aagctgagga aagtcagatg ccaagtgtc cctgcactgc ctgggcattc 480
cagcagctcg ctgaattcat ctgggggagg ctcagaaaag gggcagcatc tggagcctga 540
gagtggcgag gagaggggca agcccagagc atgagctggg tcctgggggg ttttgcagtt 600
aggacaactc aggaaccaca ggcccggcaa gagtagcttc tggagacagc tggcacgtca 660
ctgccccagg actgtgggccc gagtccgtat gggttggtg ctgcactcac ctgtgtcccc 720
tgtcctcttt ccctggacag 740

<210> 100
<211> 182
<212> DNA
<213> Homo sapiens

<400> 100
tcctgtggct acggcaccaa agacgaggac tacggctgcg tcccctgccc ggccggagaag 60
ttttccaaag gaggctacca gatatgcagg cgtcacaag actgtgaggg cttcttccgg 120
gccaccgtgc tgacaccagg ggacatggag aatgacgctg agtgtggccc ttgcctccct 180
gg 182

<210> 101

<211> 1169
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)..(1169)
 <223> n represents a, c, t, or g.

<400> 101
 gtaagcacag gccctcctgg caaacctctg catgctttct gcagaaaacc ccgaggggct 60
 acgggcaagg accttgaggaa caggggtcat ggatactgca ggcttcggtg cagccgcaca 120
 cctggccttg gtcccatccc acaaggagca gcatccagga cggagagtcc tggccctcc 180
 ggtggacagg cagcccatca ggctctgcct ctgtgtctcc taagtggcca ttaaccatca 240
 taatatcttc tgaccaccaa aaggaaacaa attgcttgaa tacttacagt gcagtagccc 300
 atgtgaaaca ctttgggaaa aagaaaactn naatttnatg caaaaagcag tatttttnagt 360
 attctggnaa cactctggnn aanctactaa taanntanat ntgagaaaag aaatatnant 420
 gangagatta tgannncgaa gnnaagnnan gnanaancan annagntnn agaaaatgag 480
 gttgnnaang antnataana tagnacann ngatnatnca tnggaaagta aacngcntga 540
 gnannaagtga tttgtgatng ccagggtatt cntngaggga aaacangact attggancag 600
 anngtgngga aaggnacaaa cgntgtntna ncataganaa nntagagttg ntgggtgggc 660
 attnnaanna gcnggtaaag aatagcttgn aagtngncaa ggggtncag aggcaannnt 720
 aatgcctata natcccataa gnntgcaggc tantggngan ggtgctnaca aagagcatgt 780
 tcctcctcca ggaaggctctg gccttngttg gtgtnacccc tggggggcta ancaggccnt 840
 acatgtgggg gcacagggat atttctgggtg natgatgtga tggcacacac actaaacaca 900
 gccaccagag agaggaacca gaaaggggct gagatcaaaa gaaaggccca cgttggcagc 960
 tcaatattgt taaaagaatg ctccatttca agacaggctg aaaccccaag gaaactgagt 1020
 ggacagagca ggtgactgag tgggcgtggc ctcatgcccg acttgattgt gggcctgcag 1080
 actggccacc gtgctctctg caccagtccc tgctgtgtg ctgtccagct cacctgtcta 1140
 ctgttttgtc cttgtgtctc ccnccgtag 1169

<210> 102
 <211> 86
 <212> DNA
 <213> Homo sapiens

<400> 102
 ctactacatg ctggagaaca gaccgaggaa catctatggc atggctctgct actcctgcct 60
 cctggcacc cccaacacca aggaat 86

<210> 103
 <211> 484
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)..(484)
 <223> n represents a, c, t, or g.

<400> 103
 gtgagtgtct ttgtccttcc accagcacgg tatttgttca ggcacggatc tctttcacta 60
 cagagggtgt aggaaagagc cggtcctggc acctggacaa ggtgaatcac agtaacagca 120
 ctagtgaagg tgctcctgtg gcctgtccag gcaggtctat gaaggagggg gcgtttgcca 180
 catctgagcc ttgagtcaga ggctgaggtt ctagtgcagg ttggccacca gctacctgac 240
 aagtcaacta acctccatga gcctcggttt tctcatcggt aatatggggg tgaagaaagn 300
 acaatancca tgactcttta gggttcatta aacagtctaa gaaatacaaa tatttagctc 360
 ccctcagcca tcactgcctc aggcccatte atgatcatga atccagatcc atgagctctg 420
 tggcagcgtg ctttgaaggt ggagcttctc tggatcatth gagggactct attttgcctt 480

gcag

484

<210> 104
<211> 87
<212> DNA
<213> Homo sapiens

<400> 104
gtgtgggagc cacttcagga gcttctgcca acttccctgg cacctcgggc agcagcaccc 60
tgtctccctt ccagcacgcc cacaaag 87

<210> 105
<211> 799
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)..(799)
<223> n represents a, c, t, or g.

<400> 105
gtgaggaggg tgctcaggta tcgatcacct ggagttaggt ggtactcgga tgaaagctca 60
gaagaggaga ggaaatgata atgagtgatg attatggtgc gcttccccac ctggcctcac 120
ctccctaata taattgaatg acatgttgcc ccccgtcag gaagtcatta tatctgcaat 180
cagagttgat ccctctatgg gtgtcctggg accgctggga ggtgctggtg gtgaaggcgg 240
gggcatagcg gcagggtggac agcacaggca gctgcaagcc cggccaggag gagagaccag 300
gcgtcctggg ctttggtttg gccngagtt aacagcaatt ctatcactgg ttttcatata 360
aacatgctga ccatagcact ttaatattaa cttgcanaan gtncattttc attctncctt 420
aaccagggaa gangggatcg nggaggaccc caangtttan tntgcctctc acanttagnc 480
ccccacntgg cttgncntna aggttgccaa agcagtagna gcgagaagca agctccctta 540
ggaacaatna ggtancccca gaaaaagtct gganaggcca agtctgaggg cagcgagcag 600
gggttggtgg cagtcctggt ctggcagcca aaaccagcgc gnaggatttg gttctcagtc 660
taagcaagca cctcagattt cagggttccc tgaaagcatc ccaggggcag ggccattgct 720
tccaggggcc ggagtcctgg agggaagacc agcaggggatc ctgagctctg ggtcattcat 780
gccttctctc caccacag 799

<210> 106
<211> 126
<212> DNA
<213> Homo sapiens

<400> 106
aactctcagg ccaaggacac ctggccactg ccttgatcat tgcaatgtcc accatcttca 60
tcatggccat cgccatcgtc ctcatcatca tgttctacat cctgaagaca aagccctctg 120
ccccag 126

<210> 107
<211> 96
<212> DNA
<213> Homo sapiens

<400> 107
gtgacggccc ccatgcgccg gtgccctgcc tcctggactc tccgtcaact cccctgtcg 60
gagagcctgg ctgctcactc cctcctctct cccag 96

<210> 108
 <211> 75
 <212> DNA
 <213> Homo sapiens

<400> 108
 cctgtttgcac cagccacccg gggaagagcg tggaggccca agtgagcaag gacgaggaga 60
 agaaagaggc cccag 75

<210> 109
 <211> 243
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)..(243)
 <223> n represents a, c, t, or g.

<400> 109
 gtctgtgaac cagggcttcc acacaccatg tgcacggtgc ccattctctgg gtggagggcg 60
 ttcccagaag cagcctctc gctgcttctg ctctcacatg ctgaaccata ctgtgcttac 120
 cgtgggggtgg tgccacacag acaccgggca gctctgcccc acaggaagag caggggtggg 180
 ctgagcgcan agccatgagc caattctaac tcctatctcc ccaacctccc catttccctg 240
 cag 243

<210> 110
 <211> 73
 <212> DNA
 <213> Homo sapiens

<400> 110
 acaacgtggt gatgtttctcc gagaaggatg aatttgagaa gctgacagca acttcagcaa 60
 agcccaccaa gag 73

<210> 111
 <211> 1174
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)..(1174)
 <223> n represents a, c, t, or g.

<400> 111
 gtatgtggaa gccccacac caagctgaac tggggctcctg tggatcctga gcagggaggg 60
 gttncaggg tgcagccgag tgaactgaca ggctagcctg ggacactatg gggacgttcg 120
 gcgacagaca gtccccacca cctcttttgc gactggcagg ggtcagggtg tgtgaggagc 180
 ctgtggaaac agctgcctgc tgcctctggg tcaggccccct gtccttgcac cctgccaaa 240
 tccctgggcc ttctcctta acatccgaat tcctcatgcc ccttctccag actgggaggg 300
 cagaacataa agccaaggat gcatgcctgt tgcggccaac acaccagtac caccctgcc 360
 ggtgccagta ctgctgccac cgtaatgctg gtaacaaccg tggatgatgac ggctaacagc 420
 atttgggtgcc tactgcccac caagtgcctg gctagggctg tgaacacatc ctnccttcca 480
 ccagcccang agcaagggtg ttggaatcat ccctgggttat aggaatacca cactgaggta 540
 tggaagtgtg cactcgcccc aagtcacaca ctagtgaaca canggcttgg ggtccgaagt 600
 ccangctccc aangagccac atggngntaa anaggtagnagn cagggtcacc cccctaagtt 660
 ccaagagggg ggcttttcna ggcacaaaagg gttccattna ggttcccttt tcaatgnctt 720

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ccagagagcc agcatggatt tcagcgccag cngcatccaa tctgtttgct ttaacatgaa 780
gacaccagtt gaacttgggt gcttactggg attaaataca gagatctagg acatatccaa 840
tgaaccttca cggagcatcc attgtgtgtc aggtagcagg gaaggagagg cccgtggatg 900
cctccacccc gcagtggcag cccagcccc ttagacgcct gcaggtcacc caccacggac 960
ttgtttgttt ggaaagaagc aggaagccac cgggtgtatgt ctcgtctcat gtcccctggg 1020
cccgtgcccc caaggtgccc agtaaaccac tgaaaaacaa gtcattgccc cccactgtcc 1080
acagctgggc aatggacaag ttcaccacag gagaacttgt cagggctgca gccccccag 1140
gcactgctaa tgaccatcgc tcttgttttt gcag 1174

```

```

<210> 112
<211> 160
<212> DNA
<213> Homo sapiens

```

```

<220>
<221> misc_feature
<222> (1)..(160)
<223> n represents a, c, t, or g.

```

```

<400> 112
cgagaacgat gcctcatcng agaatgagca gctgctgagc cggagcgtcg acagtgatga 60
ggagcccgcc cctgacaagc agggctcccc ggagctgtgc ctgctgtcgc tggttcacct 120
ggccagggag aagtctgcca ccagcaacaa gtcagccggg 160

```

```

<210> 113
<211> 226
<212> DNA
<213> Homo sapiens

```

```

<220>
<221> misc_feature
<222> (1)..(226)
<223> n represents a, c, t, or g.

```

```

<400> 113
gtgaggctcc tgcaggtgcc atgatgagct gtgagatgtg gctccctcac agccgcaagg 60
actaaaactt tcttattgaa tcagctctcc tgcaagacgg ggtgtttctc ccagaagtcc 120
aagataggag acctggacag tgacaagttc acagcaagat agtcaaaagg gaaaaaaccc 180
ctttcgtttt tgagttttgt tttttttttn ggngatgana gnctng 226

```

```

<210> 114
<211> 61
<212> DNA
<213> Homo sapiens

```

```

<400> 114
attcaaagcc ggaggaaaaa gatcctcgat gtgtatgcca acgtgtgtgg agtcgtggaa 60
g 61

```

```

<210> 115
<211> 309
<212> DNA
<213> Homo sapiens

```

```

<220>
<221> misc_feature
<222> (1)..(309)

```

<223> n represents a, c, t, or g.

<400> 115

```
agagtggngg aagagngaag ggagngnaaa agggggngag ngaggggaagg aggnngggaan 60
nnggagttag ggggggaagg ggnagagngg gnggnagngn gnggngagng gganagngaa 120
agnagtgaga ngggaaggna nagngagnag gggnnangag aaagngggag ngtaggnggc 180
gatgngnnng gtngaaatat tnanagaaat tttttcaaat aatttttatt tcatttaaatt 240
aatttttcag tgttgacctt ctattgactg tgacttgcaa catctaactg tggccattgg 300
tgtctgtag
```

<210> 116

<211> 2781

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)..(2781)

<223> n represents a, c, t, or g.

<400> 116

```
gtcttagccc cacggagctg ccatttgatt gcctcgagaa gactagccga atgctcagct 60
ccacgtacaa ctctgagaag gctgtgtgta aaacgtggcg ccacctcgcc gagagcttcg 120
gcctgaagag ggatgagatt gggggcatga cagacggcat gcaactcttt gaccgcatca 180
gcacggcagg ctacagcatc cctgagctac tcacaaaact ggtgcagatt gagcggctgg 240
atgctgtgga gtccttgtgt gcagacatac tggagtgggc ggggggttggt ccacctgcct 300
cccagccaca tgctgcatcc tgaaaagcat gcctgtgggc tgcctccca ggacaagcca 360
aggatccaac gagggctctg gagctgtgag tgggtccaaa agactgcaa gaatcaaggc 420
ttttgtgata tgtcaccgta tgcttagga tgttcaagga gccagacgaa ataaggcctg 480
tcttccaatt taaccaaaga taaaggacta gagccgggat actttcanat gctcgcctgt 540
acctcaccag gcagagtaaa tatctactca ctcatcacgc cagcccacca gccaccatt 600
aactcactga acaatgagac aatgtngagg actcaaatga atcaaacccc gtgggaatga 660
cagantgaag aatctgggtcc ctgtctttaa ggagtttgca ctccagtaga agacagaagg 720
aacgtatggt tacaaaccac ttactggaa gacgtcaaac aagctgaatg aaggggcgct 780
tagaaaacgt taatagaagt tctaagcggg agactgctcc ctactgggat gatgaaggat 840
ggcatcctag tgaagaagca gctcaaaccat ttgtataaaa tggcaacaaa atgcagacac 900
cctgctccag gtattatttc aggttttagta caagtctgtt aataccctat gtgggtttcat 960
taggataact ttttacctat ccttgaggtc atccatattc ttacaggcct tccagtcaat 1020
aatggaagag ctactctat acaaaaccaa tatgcaaggc atgtgtttgt ccaagcaatt 1080
ggatgtgtgc agtagccaat ttcatttact gcattactct ttggcctggg aaccctgtgg 1140
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gcagcaatgc tgaaggacac agcaatttaa attataatgt gtcaggctgt gttttcactt 1260
caaacatgta tgagttagtca gctgtaatta gagaaatgat gacttcctaa gaggtcagcc 1320
acgcataatt ctagatttca agagcatcta agacttgtgg attagcctca tggcatgaga 1380
gtttcagact cagccttctg agccagtcag ggaaagtggg gttctgcagc gcaaatgaga 1440
gcctgggctt ggtgtcgagg gagctggctt ctagtgtgac caccttgggc cttgtctttt 1500
cctctctctg cctcagtttc tcgtctgcca atgagatgtt agttagtgt tctataattg 1560
gggcaggttag ggttcagggt agcaaaaaga aagtggagct ataggaaatg ccaggccttt 1620
gaggtgctct atggaagtca acacagtgtg gtttgtccat ttaaattggg aaaaaaacag 1680
aaaaactcag acttggcatt ttcacaataa ctgcaatggg ttgacataac atttataggc 1740
agaaagttaa taaactggca ttgttcttgg catattattg tactatccct gtaactgcca 1800
agagctcagg agccaggcta gtgatcacac cagggggttag agttcactgc tgaactccct 1860
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cgtaaaaatt acaagttgca tgactgaaaa aatgcttttag ggggaaaaatc agtcatatct 1980
ttaacaccaa caagcaattt cccaccaacg aatgtagtac atactgtgag aggatcataa 2040
tgaggtcctg aatatttaatt atcatcattt actgtgtctg tttgctgctg tttttcgaa 2100
ctatttggtt taccctgcaa gctaaatact ccacggcaga ncttaattat ccttttaatt 2160
cctctttgaa atcctgtggt gcccccttcc cctgccttg tgatgatgat gaggtagtct 2220
ccccttaatt agactgcaa tgctacttgt gatgagtgtg ccattccagg ataacagctt 2280
gcaccctcct cagaatgttt tcagcgaagg agtgggggtgg ctgttctctg ctcttgggtg 2340
```

```

tttggcctca tttcacacta ttagaattct ggggctgtaa ggccagccag tgtcagctca 2400
tgttccattg gctctccacc tgccatTTTT agggagctat tccttatata gttacaaatt 2460
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atgggattca gaacaatgag atcataataa ttctcactga ccaaagctgg gactccatcc 2580
tgccatTTTT gtgtggagat attcataatt ctgcaatact ttaaaacatt tagaaaacac 2640
cccagggtag gtctgtggcc cttanacagt gaaagtctta attggcaata ttatttttgc 2700
taattctgga tatatataac nnattatatt tataaatctc aataaacccc atttantaaa 2760
aaaaaaaaaa aaaaaaaaaa a                                     2781

```

```

<210> 117
<211> 23
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence:
      Oligonucleotide primers that can be used to
      diagnosis ED.

```

```

<400> 117
aaaaagtaac actgatccta ttt                                     23

```

```

<210> 118
<211> 19
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence:
      Oligonucleotide primers that can be used to
      diagnosis ED.

```

```

<400> 118
agaaagcagg acctcctgg                                     19

```

```

<210> 119
<211> 24
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence:
      Oligonucleotide primer that can be used to amplify
      TNF homology domain of mouse dl.

```

```

<400> 119
ggattccagg aacaactggt atgg                                     24

```

```

<210> 120
<211> 25
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence:
      Oligonucleotide primer that can be used to amplify
      TNF homology domain of mouse dl.

```

<400> 120
cctacacaca gcaagcacct tagag 25

<210> 121
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer that can be used to amplify
TNF homology domain of mouse dl.

<400> 121
gtcgacgaaa atcagccagc tg 22

<210> 122
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Oligonucleotide primer that can be used to amplify
TNF homology domain of mouse dl.

<400> 122
aagcttctag gatgcagggg c 21